(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
16 January 2003 (16.01.2003)

PCT

(10) International Publication Number
WO 03/003878 A2

(51) International Patent Classification[7]: A47C

(21) International Application Number: PCT/BE02/00109

(22) International Filing Date: 28 June 2002 (28.06.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2001/0456 4 July 2001 (04.07.2001) BE

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(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES,*

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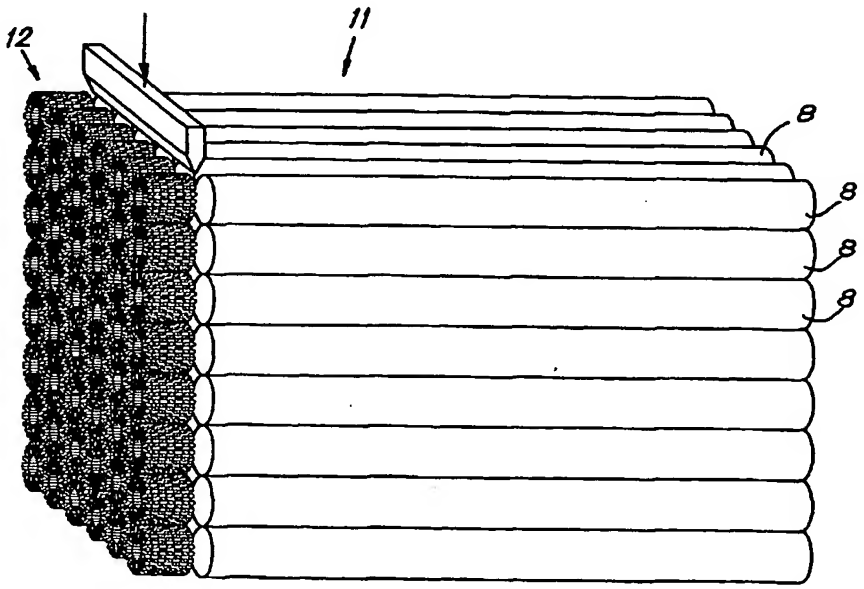
(54) Title: METHOD FOR MANUFACTURING A FILLING ELEMENT



(57) Abstract: This invention relates to a method for manufacturing a filling element. Strips (6) of synthetic or natural foam or synthetic or natural rubber are manufactured, are provided with cuts (7), are rolled up to form a tube (8), and are fixed to each other with their longitudinal lateral edges (9), after which several of these tubes (8) are glued together to a bundle (11), after which this bundle (11) is divided into shorter parts (12), whereby such part thus comprises a number of glued-together tube- shaped or ring-shaped bodies (1).

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FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

— *of inventorship (Rule 4.17(iv)) for US only*

Published:

— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Method for manufacturing a filling element.

This invention relates to a method for manufacturing a filling element.

More particularly, the invention relates to a method for manufacturing filling elements with different hardness, ranging from springy filling elements for matresses, pillows and parts of sitting and reclining furniture, up to relatively hard filling elements for sandwich panels, for example, for the automotive and aircraft industry.

The Belgian patent No. 1.007.171 describes a method for manufacturing springy filling elements for matresses, pillows and the like, whereby cylinder-shaped bodies of foam are formed individually, after which these bodies are glued with one extremity onto an underlayer, which also consists of foam. Afterwards, a top layer of foam is glued onto the other extremities of the bodies.

Anyhow, this known method allows to manufacture a relatively light-weight filling element with relatively little foam, however, has as a disadvantage that performing this method by means of machinery is time-consuming and difficult, as the bodies are strongly deformable.

The present invention aims at a method which does not possess these disadvantages and whereby a relatively light-weight filling element can be manufactured in a simple, fast manner and with relatively little material for a certain hardness, which method can easily be fully or partially automatized.

To this aim, the invention consists of a method for

manufacturing a filling element, which is characterized in that strips of synthetic or natural foam or synthetic or natural rubber are provided with cuts, are rolled up to form a tube and are fixed, in particular glued, with their longitudinal edges to each other, after which several of these tubes are glued together to form a bundle, after which this bundle is divided into shorter parts which thus comprise a number of glued-together tube-shaped or ring-shaped bodies.

From a bundle, rapidly several filling elements can be manufactured.

Preferably, the tubes are glued together over their entire length.

In this way, a stronger connection of the tubes is obtained, whereas also in a short part, it is made sure that the tube-shaped bodies or rings are glued together in a sufficiently strong manner.

The tubes can be arranged in layers and columns, whereby adjacent tubes are glued together in a layer, and tubes situated one above the other are glued together in a column.

In a preferred form of embodiment, the tubes are glued together in a holder which keeps them together, at least until the glue, used for glueing, has sufficient adhesive force.

Hereby, the tubes can be pressed against each other by means of the holder, at least in the layers, with a certain tension.

Before or after dividing the bundle into parts, a core

can be provided in the central cavity of at least a number of the tube-shaped or ring-shaped bodies, preferably in order to influence the hardness or the resiliency features of the filling element.

This core may, for example, be a hard core of synthetic material, foam or rubber, or a wire spring.

Finally, the glued-together tubes can be surrounded by a covering, for example, a layer of synthetic foam, as a result of which a smooth contour is obtained.

With the intention of better showing the characteristics of the invention, hereafter, as an example without any limitative character, a preferred form of embodiment of a method for manufacturing a filling element according to the invention is described, with reference to the accompanying drawings, wherein:

figure 1 represents a perspective view of a part of a filling element, obtained by the method according to the invention;
figure 2, at a larger scale, represents a cross-section according to line II-II in figure 1,
figures 3 and 4 schematically represent the forming of a tube, used with the method according to the invention;
figures 5 and 6 schematically represent parts of filling elements during successive steps in order to manufacture a filling element according to the invention with the tubes according to figure 3;
figure 7 schematically represents a filling element according to a possible additional step of the method.

Figures 1 and 2 represent a filling element which has

been manufactured according to the method according to the invention. This filling element consists of a number of mutually adjacent tube- or ring-shaped bodies 1 of foam, which, at places where they contact each other, are glued together over their entire length by means of glue 2.

Each tube- or ring-shaped body 1 comprises a cylindrical wall 1A of foam which surrounds a round central opening 3.

This foam is soft synthetic foam, such as polyurethane foam or synthetic latex foam.

In a variant, it is hard synthetic foam, such as polyethylene foam.

In another variant, the foam is a natural foam, this is a foam consisting of a natural material, in particular natural latex.

In still another variant, the bodies 1 and, thus, also the strips 4, are not manufactured of foam, but of rubber.

This rubber may be both synthetic as well as natural rubber. Hereby, also the elastomers must be subsumed under synthetic rubbers.

At the outside of these tube-shaped bodies 1, cavities 4 are situated which extend from the outside towards the inside. Their diameter diminishes from a maximum value at the outside of the body 1, up to practically nihil at the inside.

As represented, these cavities 4 may be approximately

lozenge-shaped, however, may also have any other shape. Preferably, they are arranged according to a staggered pattern. Also, they do not necessarily have to be provided over the entire surface of the body 1.

In the central opening 3 of each tube-shaped body 1, a wire spring 5 is provided. This wire spring 5 can be realized in metal as well as in synthetic material.

According to the invention, said filling element is manufactured as follows:

First, a number of rectangular strips 6 are manufactured, as one thereof is represented in figure 3.

These strips 6 are manufactured of the foam or the rubber of which the bodies 1 consist.

Subsequently, each strip 6 is provided with cuts 7, directed in its longitudinal direction, with a staggered pattern.

Before as well as after the application of the cuts 7, the strip 6 possibly can be cut of a larger strip, which, for example, is delivered continuously from a foam machine.

Such strip 6 with cuts 7 is represented in figure 3.

Subsequently, each strip 6 is rolled up to form a tube 8, such as represented in figure 4, after which the two longitudinal lateral edges 9 of the strip 6 are glued together.

The diameter of such tube 8 is equal to the diameter of a tube- or ring-shaped body 1, whereas the length thereof

is a plurality of the length of a body 1 or, thus, the thickness of a filling element.

The cuts 7 facilitate the rolling-up of the strip 6 to form a tube 8. When forming the tube 8, the cuts 7 are deformed, such that the aforementioned cavities 4 are created.

Preferably, the cuts 7 extend transversely through the strip 6. If this should not be the case, the cuts 7 are provided at the side of the strip 6 which, when it is rolled up to form a tube 8, is situated at the outside of the roll 8.

Subsequently, a number of such tubes 8 is brought into a holder 10, where they are stacked in horizontal layers and vertical columns to a bundle 11, as represented in figure 5. For simplicity's sake, the cavities 4 in the tubes 8 are not represented in this figure.

There, where two tubes 8 contact each other, at least one of the two is covered with glue 2 over its entire length.

This is valid for two adjacent tubes 8 of one layer, as well as for the tubes 8, situated one above the other, in a column.

Different kinds of glue 2 can be used, with one as well as with two components. Preferably, a so-called "hot melt" is used, which is made liquid by the heat and which fogs the tubes 8 in continuous or interrupted stripes.

The holder 10 keeps the tubes 8 of a layer together during drying or curing of the glue 2 and comprises, for example, movable side walls 10A which themselves exert a light pressure onto the tubes 8 in horizontal direction

in order to ensure a good glueing.

In the holder 10, as much tubes 8 are provided as bodies 1 must be present in a filling element.

When the glue 2 has sufficient adhesive force and thus is sufficiently dried or cured, the bundle 11 is taken from the holder 10 and divided into several smaller pieces or parts 12 of equal length, as represented in figure 6.

The cavities 4 in the tubes 8 are represented in the first part 12 only, however, it is clear that the tubes 8 are provided with cavities 4 over their entire length.

Dividing may take place either by cutting with a knife 10, as schematically represented in figure 6, or as by cutting with a laser beam, or also by sawing or other techniques.

With a suitable instrument, possibly several parts 12 can be cut or sawed simultaneously.

These parts must not necessarily be straight, but may have any shape. For example, for a pillow, the cut might be made with a bent shape.

It is not excluded that, depending on the form of the holder 10, the division of the bundle 8 into parts 12 takes place while the bundle 11 still is situated in this holder.

Thus, each part 12 consists of a number of tube-shaped elements 1 which are glued together.

The tubes 8 do not necessarily have to be provided in columns. The tubes 8 also may be put in the bundle in a

staggered manner. In this case, not all tubes 8 necessarily connect against each other, but the tubes 8 may be situated in, for example, one layer at a small distance from each other.

Filling elements obtained of tubes 8 of relatively rigid rubber or of relatively rigid synthetic foam can be used as a layer in sandwich material for the automotive and aircraft industry. Such filling elements may also be used as an insulating material, or in the packaging industry. The thickness of the filling elements may vary strongly and may even be limited to several millimeters, in which case the tube-shaped bodies 1 are altered to form ring-shaped bodies 1.

Filling elements obtained of tubes 8 of soft rubber or soft synthetic material form springy elements which can be used as filling material for matresses, pillows, seats and back rests of sitting and reclining furniture. Hereby, the filling element may be covered entirely or partially by a layer of foam.

The hardness and possibly resiliency features of the filling elements can be altered by providing a core in the central opening 3 of a number or of all tube- or ring-shaped bodies 1. These cores may be provided in the bodies 1 of the filling element after division, however, in a variant they can be provided in the tubes 8 before the bundle 11 is divided into pieces, and thus can be cut to length or sawed together with the tubes 8.

These cores may be manufactured of hard synthetic foam or rubber, however, in the filling element represented in figure 1, these cores are wire springs 5.

Figure 7, in fact, shows the filling element during the

application of the wire springs 5.

In another form of embodiment, wire springs 5 or other cores can be introduced in the openings which are formed between the tube-shaped bodies 1 in the filling element.

It is not necessary to provide a wire spring or another core in all openings 3 and/or openings between the bodies 1. It is even possible that no core at all is provided in the filling element.

The present invention is in no way limited to the forms of embodiment described heretofore and represented in the figures, however, such method for manufacturing a springy element may be realized in different variants, without leaving the scope of the invention.

Claims.

1.- Method for manufacturing a filling element, characterized in that strips (6) of synthetic or natural foam or synthetic or natural rubber are manufactured, are provided with cuts (7), are rolled up to form a tube (8), and are fixed to each other with their longitudinal lateral edges (9), after which several of these tubes (8) are glued together to a bundle (11), after which this bundle (11) is divided into shorter parts (12), whereby such part thus comprises a number of glued-together tube-shaped or ring-shaped bodies (1).

2.- Method according to claim 1, characterized in that the strips (6) are glued to each other with their longitudinal lateral edges (9).

3.- Method according to claim 1 or 2, characterized in that said tubes (8) are glued to each other over their entire length.

4.- Method according to any of the preceding claims, characterized in that said tubes (8) are placed in layers and columns, whereby adjacent tubes (8) are glued together in one layer, and tubes (8) situated one above the other are glued together in a column.

5.- Method according to any of the preceding claims, characterized in that the tubes (8) are glued together in a holder (10) which keeps them together, at least until the glue (2), used for glueing, has sufficient adhesive force.

6.- Method according to claim 5, characterized in that, by means of the holder (10), the tubes (8) are pressed

against each other with a certain tension at least in the layers.

7.- Method according to any of the preceding claims, characterized in that the cuts (7) are provided in the strips (6) in the longitudinal direction of the strip (6) and with a staggered pattern.

8.- Method according to any of the preceding claims, characterized in that before or after the division of the bundle (11) into parts (12), a core is provided in the central cavity (3) of at least a number of the tube- or ring-shaped bodies (1) of a part (12) of a bundle, preferably in order to influence the hardness or the resiliency features of the filling element.

9.- Method according to any of the preceding claims, characterized in that before or after the division of the bundle (11) into parts (12), a core is provided in at least a part of the cavities between the tube- or ring-shaped bodies (1) of a part (12) of the bundle (11), preferably in order to influence the hardness or the resiliency features of the filling element.

10.- Method according to claim 8 or 9, characterized in that this core is a hard core consisting of synthetic foam or rubber.

11.- Method according to claim 8 or 9, characterized in that this core is a wire spring (5).

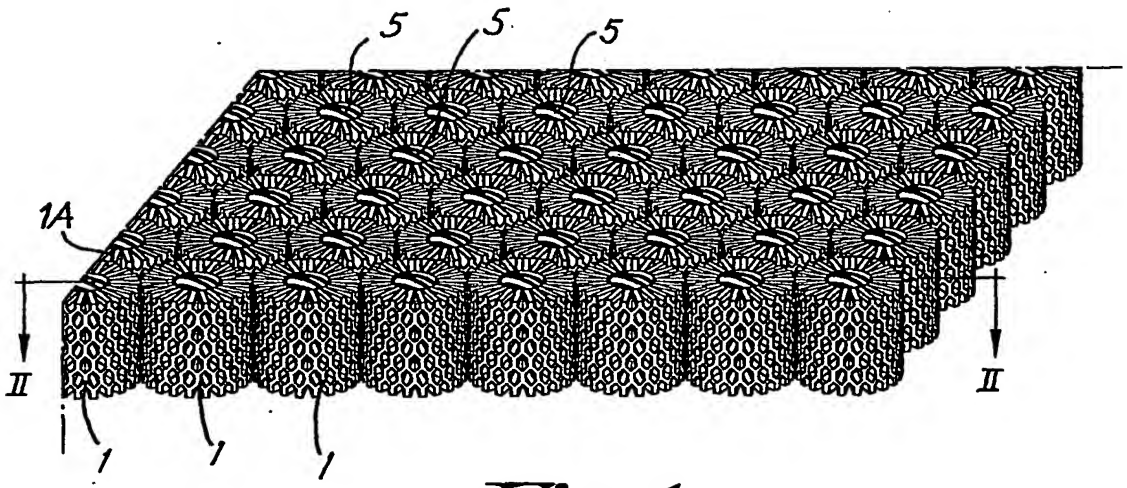

Fig. 1

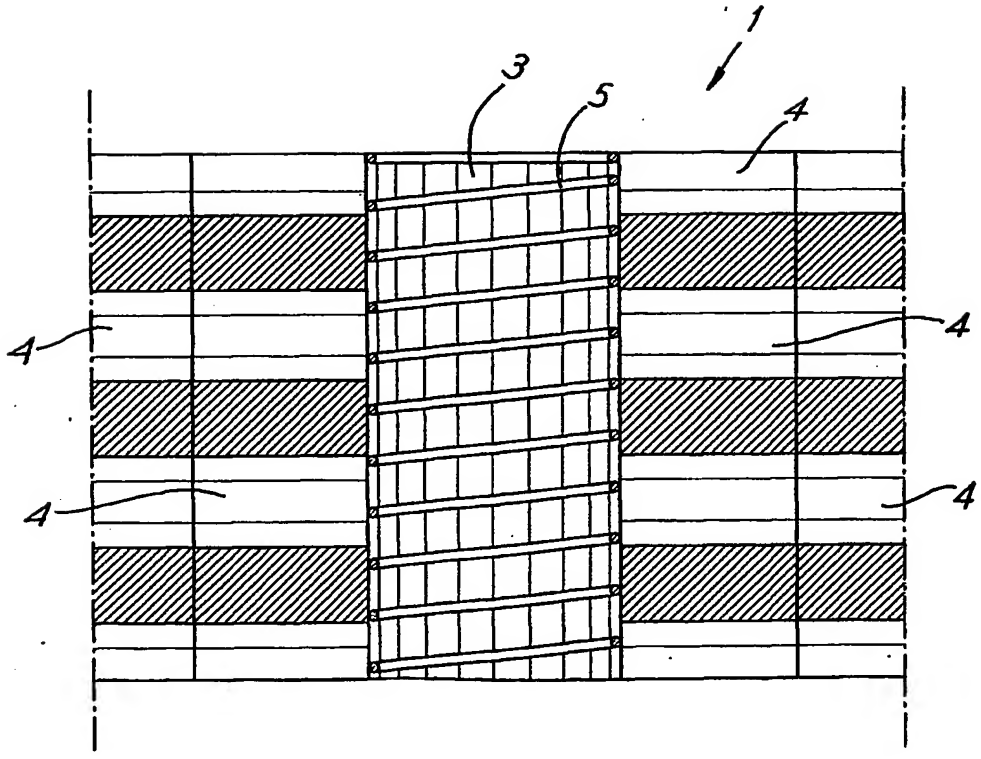

Fig. 2

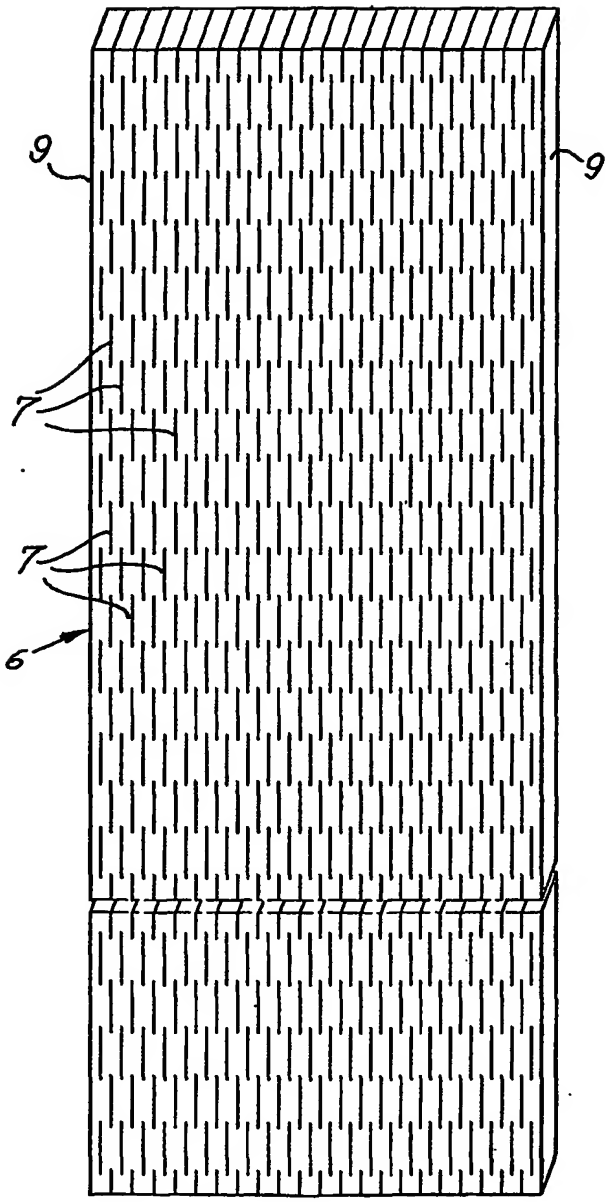

Fig.3

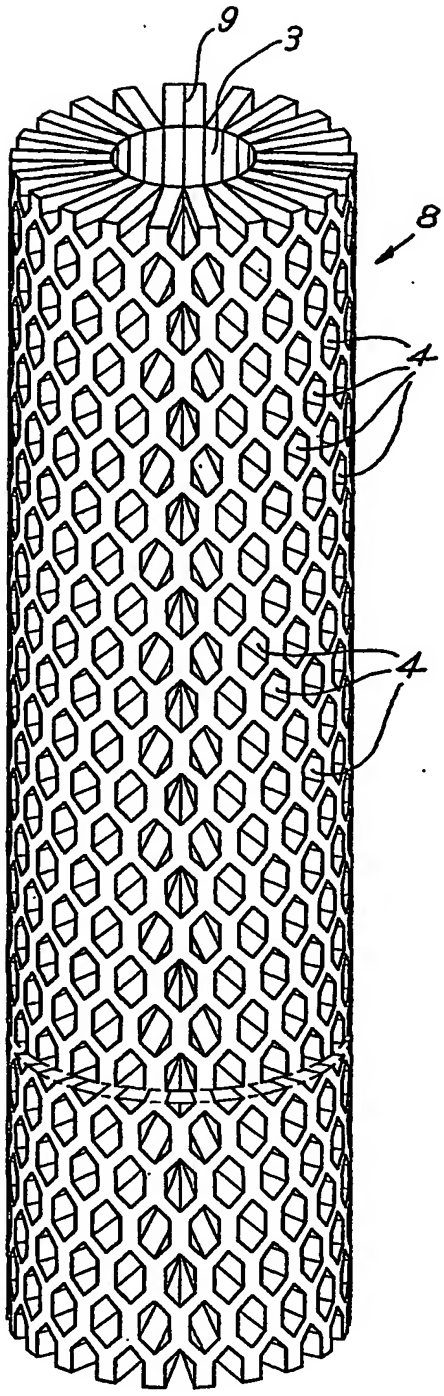

Fig.4

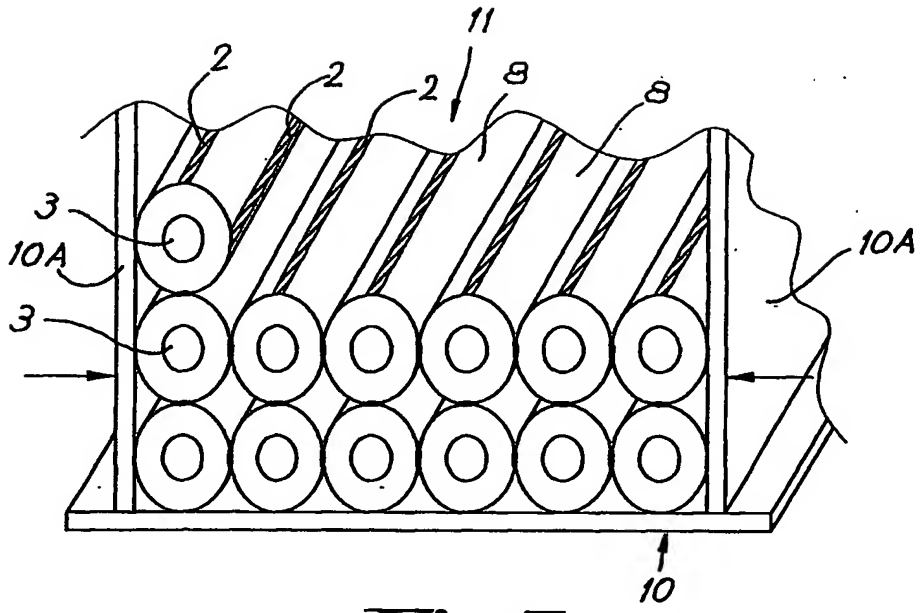

Fig.5

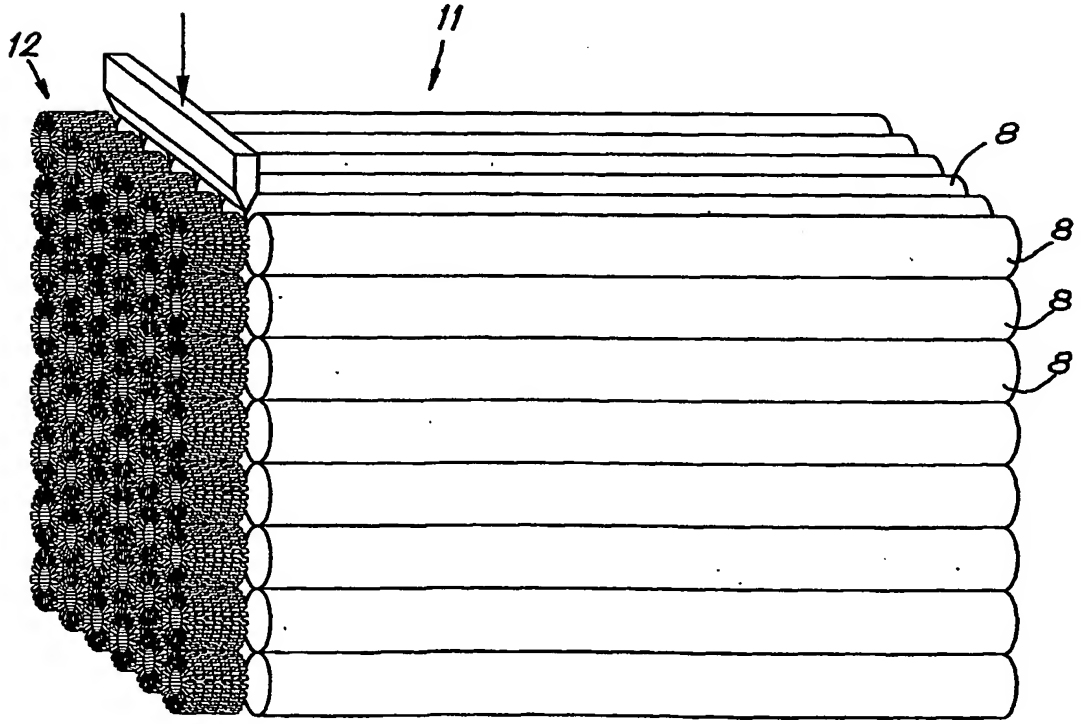

Fig.6

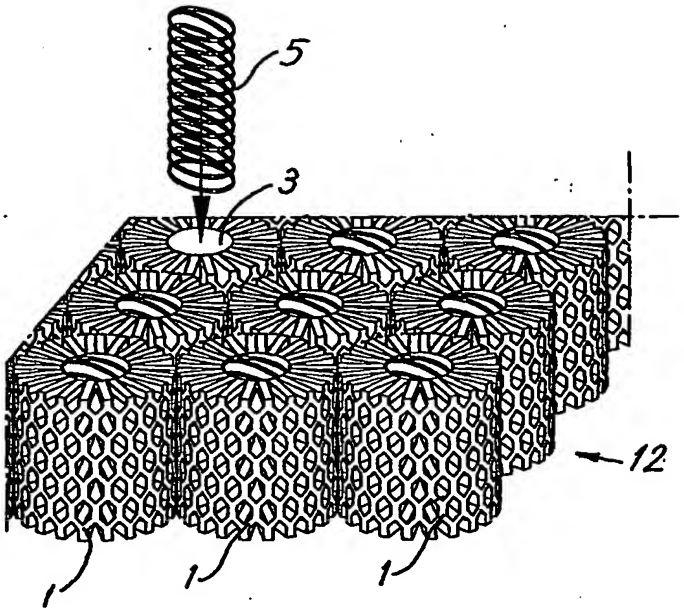

Fig.7